Model unit: Macromolecules Grade 12F

**The recommended teaching time is 11 hours.**

There will be 6 hours of class time available for delivery. This potentially demands 5 hours to be covered by homework.

Reference documents:

SEC Curriculum document p 242

Qatar Science Scheme of work pp 379 – 383

QSSC IAS Cluster G specs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| standard | objectives | Assessment | | | |
| 19.1 Know that a polymer is a macromolecule containing repeating units and recognise the difference between condensation and addition polymers. | Know that a polymer is a macromolecule | define | what | Find the monomer of | Identify the type of polymerization |
| knowledge | knowledge | analysis | analysis |
| 2 | 2 | 3 | 3 |
| **Learning intentions:** | Pretest 11F 19.4, 19.8, 19.15  Give out test in second half of previous session. 15 – 20 minutes max duration.  Mark prior to this session. Plan lesson starter based on results of test. Students do not need to see own results.  NPS: 1.2, 5.1, 7.1, 8.1 | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| standard | objectives | | Assessment |
| 19.2 Describe the manufacture and uses of synthetic addition polymers as exemplified by polythene and PVC, and of condensation polymers such as nylon and polyesters. | Describe the manufacture | | Describe by equation the manufacture of |
| synthesis |
| 4 |
| **Learning intentions:** |  | | |
| **Learning intentions:** | objectives | Assessment | |
| Describe the uses of | State 2 uses of | |
| knowledge | |
| 2 | |
|  | | |

|  |  |  |
| --- | --- | --- |
| standard | objectives | Assessment |
| 19.3 Know that living things produce many natural condensation polymers, such as proteins from amino acids, starch and cellulose from glucose, and DNA from nucleic acids. | Know that | MCQ |
| knowledge |
| 1 |
| **Learning intentions:** | Pretest 11F 19.4, 19.8, 19.15  Give out test in second half of previous session. 15 – 20 minutes max duration.  Mark prior to this session. Plan lesson started based on results of test. Students do not need to see own results.  NPS: 1.2, 5.1, 7.1, 8.1 | |

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| standard | objectives | Assessment | |
| 19.4 Know that fats and oils are natural esters formed by the alcohol glycerol with long-chain fatty acids, and understand the meaning of the term *unsaturated* when applied to these esters. | Know that | What are the products of or MCQ | |
| knowledge | |
| 1 | |
| **Learning intentions:** |  | | |
| **Learning intentions:** | objectives | | Assessment |
| understand | | Which one of the following |
| application |
| 3 |
|  | | |

|  |  |  |  |
| --- | --- | --- | --- |
| standard | objectives | Assessment | |
| 19.5 Show how the typical structural features of soaps and detergents can explain how they can readily solubilise oily stains. | Show how | MCQ | Referring to the structure… explain how… |
| Knowledge | Application |
| 1 | 3 |
| **Learning intentions:** |  | | |

Topic plan:

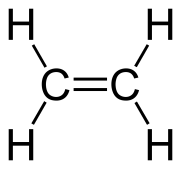
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| standards | Time allocation | what | how |
|  | 20 mins | Revise the section earlier this year on polymerisation of alkenes | Pretest – formative assessment |
| 19.3  19.1  19.2 | 1 | Know that a polymer is a macromolecule containing repeating units and recognise the difference between condensation and addition polymers.  Know that living things produce many natural condensation polymers, such as proteins from amino acids, starch and cellulose from glucose, and DNA from nucleic acids. | Set hwk for 19.2 to be continued |
| 19.2 | 1 | Describe the manufacture and uses of synthetic addition polymers as exemplified by polythene and PVC, and of condensation polymers such as nylon and polyesters. | Make nylon  ask them to make a nylon by reacting decanedioyl dichloride with 1,6-diaminohexane and drawing out the nylon polymer formed at the interface using tweezers. |
|  | 30 mins |  | Formative assessment |
| 19.4 | 1 | Know that fats and oils are natural esters formed by the alcohol glycerol with long-chain fatty acids, and understand the meaning of the term *unsaturated* when applied to these esters. |  |
| 19.5 | 1 | Show how the typical structural features of soaps and detergents can explain how they can readily solubilise oily stains. | Make soap |
|  |  |  |  |
|  | 40 mins |  | Summative assessment |

**Previous knowledge test (11F) – suggested questions**

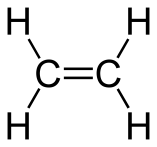
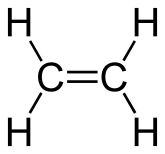
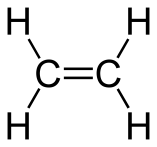
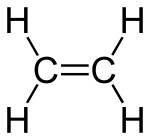
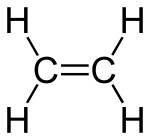
19.4 – Describe the chemistry of alkenes as the chemistry of the double bond, exemplified by addition and polymerization

**Question 1**

1. State the name of the molecule



1. Name the process shown by the following reaction:

+

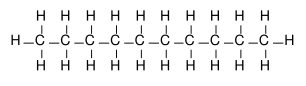
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etc

etc

1. Name the product formed in the reaction above

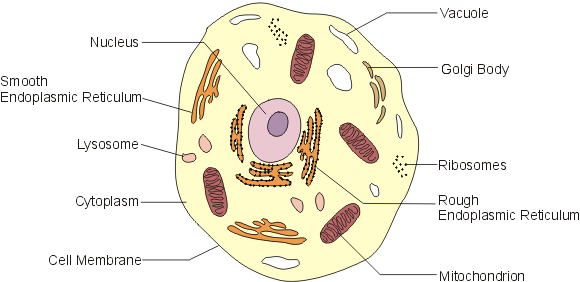
19.8 – Know that many organic compounds are made from plant and animal material

**Question 2**

1. Name the element found in all organic compounds:

DNA is found in all living things

1. Here is a diagram of an animal cell. Place a cross (X) on the structure that contains DNA



1. What is the purpose of DNA?

Cellulose is a macromolecule composed of repeating units of glucose.

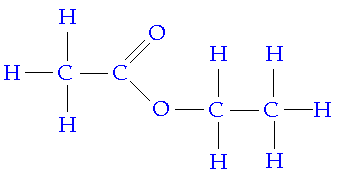
Complete the table:

|  |  |
| --- | --- |
| **macromolecule** | **repeating unit** |
| cellulose | glucose |
| starch |  |
|  | amino acid |
|  | nucleotide |
| polyester |  |

19.15 – Describe the characteristic structure of esters and know that they can be hydrolysed to the alcohol and acid

**Question 3**

1. Name the compound below



1. To what general class of compounds does it belong?

**Cluster G Assessment (total 25 marks)**

**Section A – Short answers (total 9 marks)**

**Question 1** (19.3) MCQ

1 mark

**Question 2** (19.4) MCQ

1 mark

**Question 3** (19.5) MCQ

1 mark

**Question 4** (19.1) define

(a)

1 mark

(b)

1 mark

**Question 5** (19.1) what

(a)

1 mark

(b)

1 mark

**Question 6** (19.2) state two uses of

(a)

1 mark

(b)

1 mark

**Section B – Long answers (total 16 marks)**

**Question 7** (19.1)

(a) find the monomer of

(i)

(ii)

(iii)

3 marks

(b) identify the type of polymerization

(i)

(ii)

(iii)

3 marks

**Question 8** (19.4) which one of the following

3 marks

**Question 9** (19.5) referring to the structure... explain how...

3 marks

**Question 10** (19.2) describe by equation the manufacture of

4 marks